Editor's note: 90 I.D. 262; Reconsideration granted; decision vacated in part; remanded to Hearings Division -- See 81 IBLA 94 (May 29, 1984)

UNITED STATES
v.
J. GARY FEEZOR ET AL.

IBLA 79-407 Decided June 29, 1983

Appeal from a decision of Administrative Law Judge E. Kendall Clarke declaring 11 lode mining claims null and void for lack of discovery. CA-4800.

Affirmed as modified.

1. Mining Claims: Contests -- Rules of Practice: Generally

Where a stipulation as to the admissibility of various assay results is made by the Government and a mineral contestee, and the contestee clearly asserts his view as to the scope of the stipulation, it is the obligation of the attorney for the Government, if his interpretation differs, to clearly state his view so as to put the contestee on notice as to this conflict. Where this is not done, the stipulation will be enforced in accordance with the contestee's understanding.

2. Mining Claims: Discovery: Geologic Inference

While geologic inference cannot be used to show the existence of a mineral deposit, where an exposure exists which shows high and relatively consistent

values, geologic inference can be used to infer sufficient quantity of similar quality mineralization beyond the actual exposed areas, such that a prudent man would be justified in expending labor and means with a reasonable prospect of success in developing a paying mine.

3. Mining Claims: Discovery: Geologic Inference

Where the evidence of record shows that the results obtained by surface sampling are unreliable as a basis upon which to predicate estimates of a value at depth, such sample cannot serve as a factual predicate for inferring an extension beyond the exposed area.

United States v. Edeline, 39 IBLA 236 (1979), overruled to extent inconsistent.

APPEARANCES: Kenneth L. Allen, Esq., Patricia G. Munger, Esq., and Leo N. Smith, Esq., Tucson, Arizona, for contestees; John McMunn, Esq., Office of the Solicitor, Department of the Interior, San Francisco, California, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE BURSKI

J. Gary Feezor, Elladene Feezor, John W. Hogle, Sr., and Nedra L. Hogle appeal from a decision of Administrative Law Judge E. Kendall Clarke, dated April 16, 1979, which held various lode mining claims located in the Death Valley National Monument null and void for lack of discovery of a valuable mineral deposit.

Appellants were the owners of 32 lode mining claims, known as the Copper Lodes Nos. 1 through 32, located in protracted secs. 32 and 33, T. 28 N.,

R. 3 E., and protracted sec. 5, T. 27 N., R. 3 E., San Bernardino meridian, Inyo County, California. These claims had been located between 1965 and 1969 by contestees' predecessors in interest. At the time that the claims were located the land was open to mineral entry. However, pursuant to the provisions of the Mining in the Parks Act, Act of September 28, 1976, 90 Stat. 1342, 16 U.S.C. § 1901 (1976), lands within the Death Valley National Monument were closed to further mineral entry and location. 1/ The claims in issue herein were recorded pursuant to section 8 of that Act. See 16 U.S.C. § 1907 (1976).

Pursuant to a request of the National Park Service (NPS), the California State Office, Bureau of Land Management (BLM), filed a contest complaint on January 11, 1978, alleging that "[t]here are not presently disclosed within the boundaries of the mining claims minerals of a variety subject to the mining laws, sufficient in quantity, quality, and value to constitute a discovery." Contestees timely denied this charge, and a 3-day hearing was held before Judge Clarke.

In his decision, Judge Clarke noted that at the hearing the contestees had stipulated that the only claims with which they were concerned were the Copper Lodes Nos. 1, 2, 3, 5, 7, 8, 9, 10, 13, 14, and 28 (Decision at 2; see Tr. 485). Thus, all discussion was directed to the existence of a discovery within the limits of these claims. Judge Clarke held all of these claims to be null and void for want of a discovery of a valuable mineral

1/ Section 3(d) of the Mining in the Parks Act, supra, repealed the Act of June 13, 1933, 48 Stat. 139, 16 U.S.C. § 447 (1976), which had extended the mining laws to the Death Valley National Monument.

deposit because of insufficient showings as to quantity and quality of copper ore, noting that contestees were attempting to use geological inference in order to project copper ore onto those claims which had not been drilled. Judge Clarke rejected this, expressly holding that "[u]nder the mining laws of the United States geological inference may not be used to establish the existence of a valuable mineral deposit" (Decision at 10). Contestees timely pursued an appeal to this Board.

In their statement of reasons for appeal, contestees basically argue that Judge Clarke improperly limited the use of geologic inference and contend that the preponderance of the record evidence establishes a discovery on all of the claims; that Judge Clarke erroneously refused to consider geologic inference for the purpose of delimiting the quantity and quality of the ore bodies shown to exist on the claims; and that Judge Clarke improperly discounted the value of various chip surface samples taken by Occidental Minerals Corporation (OXY), in derogation of a stipulation entered into by the parties. Because we deem this latter question to be of considerable importance as to the ultimate conclusion, we will examine it first.

In order to understand the contentions of the parties, it will be necessary to set forth some of the factual bases of this appeal at length. While a number of claims are involved in this appeal, there are three distinct mineralized areas under consideration: Area A (also referred to as the South body), clearly located in claim Nos. 1 and 2, and which appellant argues continues into claim Nos. 3, 13, and 14; Area B (also referred to as the North body), located in claim Nos. 5, 7, 8, and 9; and Area C (also referred to as the Middle body), located in claim Nos. 10 and 28.

Different degrees of exploration have occurred in these areas. Area A has had by far the most extensive amount of data developed. This consists of 6 holes drilled in 1968 by Tom Beard, 65 holes drilled in 1969 under the supervision of Richard E. Mieritz, and 5 holes drilled by Norandex, Inc., in 1970. In addition, OXY conducted a surface sampling program for the areas embraced by the claims in 1975. While these samples were primarily chip samples, some soil samples were taken in Area C. While data was available from nearly all of these samples, no one who took them actually testified or was present at the hearing. In order that this data might be admissible without problems relating to proper foundation, a stipulation by the parties as to the admissibility of the data was made. Because of the importance which the scope of the stipulation now has, we set forth the hearing colloquy related thereto in its entirety.

[1] Initially, the stipulation was not the subject of great discussion. After the Government moved to introduce various of these reports, the following exchange occurred:

> JUDGE: It's my understanding, Counsel, that there is a stipulation to the admission of these reports.
>
> MR. ALLEN: There is, Your Honor, provided that there is an understanding. And I want the understanding clear because I'm not ready at this time to put in ours. But Mr. McMunn and I discussed this, that all factual data which are being used were used by these men in forming their opinion, which are not included in those reports, are going to be by stipulation admissible as we proceed again for time-saving and also to get the facts before Your Honor.
>
> I have no objection to stipulating any of those as long as that understanding -- so it doesn't change down the road is my concern.

MR. McMUNN: That's my understanding.

JUDGE: Then by stipulation, Contestant's Exhibits 1, 2, 3, and 4 are received. (Tr. 6-7).

Subsequently, however, in the course of examining Walter Gould, a witness for the Government, counsel for the Government elicited testimony from Gould that he could find no evidence of any channel samples taken by Oxy. This testimony led to a lengthy exchange between counsel.

MR. ALLEN: Excuse, me, Mr. McMunn. Your Honor, I have a little bit of problem with Mr. McMunn's line of questioning. I thought we had an agreement that this factual data that was used by the respective people was stipulated and going to be as they came into evidence.

And it seems to me he's now in derogation of that stipulation and agreement and questioning whether some of the factual data was done.

MR. McMUNN: I think we stipulated that the items, themselves, the reports, to go in. We didn't stipulate that every item in the report was exactly correct because, of course, there is some contradiction between the different reports. As you know, the greatest example being O'Brien and Fletcher.

So we've just stipulated that we could put those items into the record without having to lay a foundation and so forth on them.

JUDGE: That's not your understanding of the stipulation?

MR. ALLEN: As to factual data, it wasn't. As to this gentleman's interpretation, I understand everybody is going to go 180 degrees possibly.

MR. McMUNN: This is Gould's interpretation of this data, and he disagreed with some of it.

MR. ALLEN: If I can, Your Honor, what I'm pointing out, first of all, I don't object in an administrative hearing like

this to Mr. McMunn leading the witness and making testimony and having him answer yes or no.

But I do when he seems to be questioning the validity of the factual data, which I understood we had an agreement on, was taken in, was going to be admitted as factual data as other people's interpretations.

He seems to be in an area of questioning whether that factual data was even done.

MR. McMUNN: I might note that we do not have in the record a report from Occidental specifically on this surface sample that we're discussing. There are mentions of it in reports by Fletcher and by O'Brien. But we don't have reports from Occidental Company telling exactly what, how, and where they did sampling. Although we do have people secondarily drawing upon sample results that they got from somewhere that purportedly are from Occidental.

Those results are what we're talking about. We're not actually talking in this line of testimony with Mr. Gould about any of items 1 through 4 or A explicitly.

MR. ALLEN: Your Honor, I'm a little concerned and I'll tell you why. It's because I didn't sit here and take all the time this morning to put all of our evidence in because I thought we had our understanding clear.

Mr. McMunn has put in as an exhibit two of the Occidental test results with a cover letter, which includes a certain sample map and assay report, both of which I, as counsel for the Contestees, furnished that gentleman who is on the witness stand at the time he visited the field. He's had them available.

Those are factual data that people use.

JUDGE: That's Exhibit 3.

MR. ALLEN: Exhibit 3, except that Mr. McMunn said, I don't have those now here. And I said, I'll put them in later and save time and let's press on.

Now he's questioning whether those samples were done or done right or the assays were done or done right.

JUDGE: Wait a minute. I'm a little confused. Apparently Exhibit 3 did not contain all the background data. Is that correct.

MR. McMUNN: That's right. I don't have it.

JUDGE: You've never seen it, nor has your witness seen it.

MR. McMUNN: That's right. Well, he may have seen it. I haven't. I don't dispute that Mr. Allen may have given him a

copy of it, but I personally haven't seen it and it hasn't been given to me.

If Mr. Allen would like to introduce it for use in cross examining Mr. Gould, I would have no objection to that. But it's not in the record at this time.

JUDGE: Mr. Allen, I --

MR. McMUNN: There are references to it, though, in some of those reports.

MR. ALLEN: That's not my problem, Your Honor. I realize he's probably not going to object if I put it in.

But that whole line of questioning is raising in derogation of our stipulation, that those samples were not done either correctly and that they were done wrong, or something.

Now, I'm not saying Mr. Gould disagreed basically with Mr. McMunn's statements that you couldn't find this, you couldn't find that. That factual data, which that is, and the maps therefrom, were a part of our stipulation as I understood it. And whether they interpret them differently, fine. He can interpret them anyway and testify anyway.

But that was not the problem.

JUDGE: All right, has he ever seen this other document that we're talking about?

MR. ALLEN: Mr. Gould?

JUDGE: Yes.

MR. ALLEN: Unless he's going to say he didn't, I gave it to him.

MR. McMUNN: Let's ask Mr. Gould. Do you recall seeing these items he's referring to?

THE WITNESS: Yes.

JUDGE: Now, basically I understand Mr. McMunn's questioning is that in certain of these areas, you didn't see any evidence of channel samples or drill holes or other things being taken. You won't say that there weren't some. You did not see any.

THE WITNESS: I've seen the drill holes. However, the channel samples, the surface samples, I didn't see where any of those were taken.

I don't know how they took them. I don't know if they took one rock and said, this will represent ten feet. I don't know how they took the samples.

JUDGE: But you're not saying they didn't take some sort of samples.

THE WITNESS: No, I'm not.

JUDGE: You just didn't see any evidence of channels having been cut.

THE WITNESS: That's true.

JUDGE: I think that's within the agreement.

MR. ALLEN: I just wanted you to understand what my problem was.

(Tr. 58-62).

It seems clear to us that contestees understood the stipulation to mean that the Government admitted that both the taking and assaying of the samples had been performed correctly, though the relevance of the individual samples and the conclusions to be drawn from the assay results were clearly matters of possible dispute.

In their statement of reasons for appeal, contestees suggest that Judge Clarke discounted the chip sampling performed by Oxy because of the inability of the Government's witness to ascertain when or how the chip sampling was conducted. This, contestees argue, was in violation of the terms of the agreed stipulation.

Counsel for the Government disagrees with contestees on the scope of the stipulation, expressly arguing that:

> No one agreed that all the data contained in the reports stipulated into evidence was correct and unimpeachable. The data

> did not itself agree. It was simply stipulated in to spare having to lay a foundation for it item by item.

(Answer at 18).

Our review of the record supports contestees' view of the scope of the stipulation. First of all, as we have indicated above, the construction that contestees were placing on the stipulation was clear from the record. If the Government's counsel was of a contrary mind, it was his obligation to expressly place his interpretation in the record at that time, so as to put contestees clearly on notice of this differing construction. This the Government's counsel did not do. We believe that the hoary legal maxim "qui tacet, consentire videtur" is properly applied.

Moreover, insofar as counsel for the Government alleges that "the data did not itself agree," we find that the record does not support this broad assertion of fact. Thus, in reference to the drilled section of Area A, James B. Fletcher, one of contestees' experts, testified that results based on extrapolations from the chip sampling data were "compatible" with results derived from the drilling hole data (Tr. 38). While it is true that Robert Mitcham, one of the Government's experts, testified that the chip sampling in Area A showed surface value in areas where the drilling had established a lack of values at depth, the thrust of his statement was that this supported prior testimony by Gould that surface sampling was unreliable because of the possibility of anomalies (Tr. 175). 2/ Thus, this testimony properly relates

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2/ Appellants have also attacked Mitcham's testimony on this point, arguing that the Government's Exhibit 6, on which Mitcham was basing his argument, incorrectly located various drilling holes. The question concerning which exhibits correctly show the loci of the drilling holes will be examined, infra.

to the question of the efficacy of surface sampling, not whether the sampling was correctly done.

We hold, therefore, that the parties stipulated that all sampling, including the surface chip sampling performed by OXY, was correctly done, and that the Government is bound by this stipulation. A review of Judge Clarke's decision, however, fails to convince us that Judge Clarke violated the terms of the stipulation. While Judge Clarke did, in fact, recount the testimony of both Gould and Mitcham relating to their inability to determine how the surface samples were taken (Decision at 5), Judge Clarke did not premise his conclusions on the unreliability of the sampling technique. Rather, he held that since surface sampling might yield anomalous results because of the possibility of either enrichment or leaching, he did not accord them probative weight, and further, he rejected any attempt to project ore reserves on the claims other than Nos. 1 and 2, because it required use of geologic inference. Regardless of the validity of these ultimate conclusions, we do not find that Judge Clarke misapplied the terms of the stipulation. 3/

Judge Clarke's summary of the testimony adduced at the hearing has not been challenged by either party. We set it forth here in order to provide a focus for the substantive contentions of the appellants:

3/ However, we do wish to make it clear that, to the extent contestees argue the testimony of Government experts that chip sampling was an unreliable method by which to determine the quantity and quality of reserves was also beyond the scope of the stipulation (see Statement of Reasons at 9), their argument is similarly rejected. As we read the stipulation, challenges to the efficacy of chip sampling to determine quantity and quality of the deposit were clearly not foreclosed.

At the Hearing, evidence was introduced through witnesses and exhibits. The Contestant's witnesses are all employees of the National Park Service, David Jones, a mining engineer, Walter Gould, a geologist, Robert Mitcham, a mining engineer, and Robert D. O'Brien, a mining engineer. The Contestees' witnesses consisted of James B. Fletcher, a mining engineer (employed as a consultant on behalf of the Contestees), Thomas A. Clary, a geologist (employed as a consultant on behalf of the Contestees), and James Gary Feezor, one of the Contestees.

Prior to introduction of any evidence, it was stipulated by counsel for the Contestant and for the Contestees that certain reports be entered into evidence. These reports had been made available to the various witnesses. The stipulation specifically encompassed Contestant's Exhibits 1-4 and Contestee's Exhibits A-F.

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The data used by the various witnesses was from past drilling on the claims by Tom Beard, who engaged in an exploration drilling program in 1968, Richard E. Mieritz, a one time claimant who drilled them in 1969-71, and Norandex, Inc., which drilled the claims in 1970. (See, Exhibits 1, 2, 4, 10, and A; Tr. 49, at 6; 50, at 15; 155, at 22; 162, at 8; 173, at 24; 176, at 12; 189, at 11; 194, at 22; 248, at 21; 271; 377, at 10; 381, at 22.)

Each of the witnesses who analyzed the available drilling data related to the claims agreed that it established the existence of a copper deposit lying on claims 1 and 2. Other areas in the claim group which were drilled yielded no or poor value.

The copper deposit drilled on claims 1 and 2 contains approximately 400,000 tons, at a grade of approximately .50 copper. Tonnages and grades derived on the deposit varied somewhat between the witnesses who computed them due to their use of different cut-off grades in their respective analysis of the existing data (Tr. 50, at 9-10; 173, at 15-23; 273, at 5-6; 380, at 14-25). All agreed, however, that a deposit of the size and grade established by the available drilling data would not be economic to mine, as it would not justify the capital investment necessary to remove it from the ground (Tr. 51, at 22-24; 63, at 14-19; 177, at 2-12; 291, at 3-5; 417, at 18; 418, at 6).

The locations of drill holes could be established on the ground. The drilling programs were mapped. Samples were taken at uniform intervals on the drill cuttings. Assay results on the samples so taken were available (Tr. 158-176; 181, at 9; 198, at 1). Some questions of interpretation arose concerning the bottoms of some of the holes, but the parties implicitly stipulated to the admissibility and use of the available drilling data.

The Occidental Minerals Corporation engaged in a surface sampling program on the claims at issue in 1975. Results from Occidental's sampling were relied upon by the Contestees in their presentation, but not by the Contestant.

Witnesses for the Contestant were unable to determine with precision where or how the Occidental surface samples were taken when they investigated the claims.

Mr. Gould testified:

> I've seen the drill holes. However, the channel samples, the surface samples, I didn't see where any of those were taken. I don't know how they took them.

Mr. Mitcham, who testified to having been over all the property covered by the claims (Tr. 174, at 1), was unable to find evidence of such trenching as would have allowed Occidental to get down to bedrock and properly sample the claims.

In contrast to the testimony of Mr. Gould and Mr. Mitcham, Mr. Fletcher testified that the surface samples taken by Occidental were generally chip samples taken at exposures and projected down dip, although some were soil samples taken in areas with poor exposures (Tr. 395, at 5; 401, at 6). Mr. Fletcher admitted that areas which he projected to have ore bodies were cut-off by faulting, as had earlier been pointed out by Mr. Jones. (See, Exhibit 5; Tr. 17, at 10; 27, at 7; 36, at 7-18; 395, at 13-15; 396, at 19-22; 398, at 2-8; 399, at 1-8, 14-20.)

* * * * * * *

Mr. Gould testified that in Area A the ore was outlined by barren drill holes which fenced off the dimensions of the deposit, Tr. 133, and that none of the holes bottomed in increasing copper values outside of the mineralized area. Tr. 135. In Area B, Mr. O'Brien did not believe that the testing could be taken to show any extensive copper mineralization. He found two holes that had been drilled in the area which he believed to be either barren or low because it was his opinion a lot more drilling would have been done if they were not barren. Tr. 56. He did not find any trenches where channel samples could have been taken and it was his opinion that it would be necessary to dig trenches in order to take adequate channel samples. Tr. 57.

Mr. O'Brien testified that the major mineralization was on claims 1 and 2 with a small pod of mineralization on claim No. 7, with minor outcrops on claim No. 13. Tr. 296. In regard to the outcrop on claim 7, he stated that "Looking at it from the surface of what I could see, it was barren. And breaking the rock,

it was barren." Tr. 300. He could not find any extension of the mineralization. Tr. 302.

Mr. Mitcham testified that in his investigation of area B that the Mieritz drill holes obtained values in the area of .0 percentage, Tr. 174, and that in his opinion this proved that the surface outcrop in the area had no extension. Concerning Area C, Mr. Gould testified that he could find no evidence of mineralization in the area at all. Tr. 55. In the middle area he found just dolomite, that is on claims 8, 10, and 28. No indication of copper. Tr. 138, 139. Mr. Mitcham testified that he looked for outcrops in Area C, but was unable to locate any. Tr. 174, 175. Mr. O'Brien, who spent some seven days on the property in 1974 found only mineralization on claim 7, with some minor outcrops on claim 13. Tr. 296.

None of the witnesses for the Contestant believed that in determining the extent of mineralization, one could reasonably use the surface samples, used by Mr. Fletcher, to project ore reserves, and all of the witnesses for the National Park Service, who were all well qualified mining engineers or geologists, stated that a prudent man would not be justified in spending his time and means with a reasonable prospect of developing a paying mine on any or all of the claims. Mr. Gould testified that he didn't think anyone would use surface samplings to compute reserves but that you could only use surface sampling as an indication of what you have.

The Contestees employed Mr. Fletcher to make an economic feasibility study of the Copper Lode Claims. Mr. Fletcher is a consulting mining engineer with many years of experience, particularly in the area of in-situ leaching. Tr. 360-367. Mr. Fletcher testified his evaluation was essentially a two-stage process. First, he ascertained the nature and configuration of the mineral deposit. Second, he combined his evaluation of the deposit with his calculation of all the various capital and operating costs involved in order to determine the return on investment and the discounted cash flow at a given price per pound of copper.

The Contestees also employed Mr. Clary, a geologist with many years of experience which included in-situ leach operations. Tr. 444-448. Mr. Clary made a short visit to the Copper Lode claims, appraised Mr. Fletcher's Report and attended the Hearing for purposes of appraising the testimony from a geologist's standpoint. Tr. 450.

Mr. Fletcher's Report and conclusions are set forth in Contestees' Exhibit A. In his report and in his testimony, Mr. Fletcher expressed the opinion that there existed three ore deposits within the boundaries of the eleven contested claims, consisting of (Area A), (Area B), and the Middle (Area C), these in his opinion, would justify a prudent man in expending his time

and his efforts with the reasonable prospect of developing a valuable paying mine within the boundaries of each of the eleven claims. Tr. 403-405.

Mr. Fletcher testified that in determining the nature and configuration of the mineral deposits, he first compared the results obtained from the chip samples taken by Occidental from within the "drilled out" area of the South Ore Body to the drilling results to see if the chip sampling results correlated with the drilling results. Mr. Fletcher testified that the chip samples within the "drilled out" area were taken at various intervals from the top to the bottom of the strata-bound mineralized zone, not only as a further check of the drilling results but also to ascertain whether or not a chip sampling program could be used to fairly evaluate that portion of the mineralized zone within which no significant drilling had been done. Tr. 377-379. Having determined that the chip sample results compared favorably with the drill results (Tr. 389-381, 389), Mr. Fletcher then considered the chip sample results obtained beyond the "drilled out" area in computing the total reserves. He testified that the chip samples were taken from sampling points throughout the thickness (as well as the lateral extent) of the mineralized zone, thus giving the "third dimension" necessary to establish the validity of the geologic projections. Tr. 383, 392-396, 398-401. Both Mr. Fletcher and Mr. Clary described the method and manner of measuring the thickness of the mineralized sections and both testified as to the validity and usage within the industry of this method of reserve computation. Tr. 390, 460, 466, 481.

Based upon his evaluation of the nature and configuration of each of the mineral deposits, Mr. Fletcher concluded that ore reserves exist as follows:

		Within COPPER LODE	
Deposit	Tons	% of Copper	Claims
South Ore Body (A)	2,480,000	0.55	1, 2, 3, 13, and 14
North Ore Body (B)	700,000	0.77	5, 7, 8, and 9
Middle Ore Body (C)	1,030,000	0.30	10 and 28
	4,210,000	0.53	

See Contestees' Exhibit A, p. 1. Mr. Fletcher stated in his Report that his reserve estimates are conservative and in arriving at the estimates he used a 0.30% copper cutoff grade.

Mr. Clary, based on his review of information, data and reports and his examinations of the Copper Lode properties also expressed an opinion that minerals had been found of such character

> that a person of ordinary prudence would be justified in the further prospect of success in developing a valuable mine within the boundaries of the eleven contested claims. Tr. 471-472, 474-476.

(Decision at 2, 4-8).

As is clear from a review of the evidence, there exist two major areas of contention: (1) to what extent can geologic inference be used to establish the quantity and quality of a mineralized deposit; and (2) assuming that geologic inference can be so utilized, what inferences are properly drawn from the evidence of record. We will proceed to a consideration of these two questions.

[2] Two general statements have repeatedly been made with reference to use of geologic inference. First, geologic inference may not be relied upon to establish the existence of a mineral deposit. See Henault Mining Co. v. Tysk, 419 F.2d 766 (9th Cir. 1969); United States v. Watkins, A-30659 (Oct. 19, 1967), aff'd sub nom. Barton v. Morton, 498 F.2d 288 (9th Cir. 1974); United States v. Reylea, A-30909 (June 25, 1968), aff'd, Reylea v. Udall, Civ. No. 3-58-20 (D. Idaho 1970); United States v. Edeline, 39 IBLA 236 (1979); United States v. Hines Gilbert Gold Mines Co., 1 IBLA 296 (1971). Second, it has also been the consistent view of the Department that "[w]hile geologic inference may not be relied upon to establish the existence of a mineral deposit, it may be accepted as evidence of the extent of a deposit." United States v. Hooker, 48 IBLA 22, 30 (1980) quoting United States v. Larsen, 9 IBLA 247, 262 (1973), aff'd, Larsen v. Morton, Civ. No. 73-119 TUC-JAW (D. Ariz. Oct. 24, 1974). While these two general principles are not

necessarily inconsistent, a review of the case law shows that a tension has developed over the nature of the mineral deposit which must be exposed in order to permit use of geologic inference.

Thus, on the one extreme are cases such as United States v. Edeline, supra, which have arguably held that geologic inference "cannot be used as a substitute for evidence sufficiently showing the existence of an ore body or bodies necessary to warrant a prudent man to develop a valuable mine." Id. at 241 (emphasis supplied). These decisions imply that a discovery of a valuable mineral deposit must be shown to exist before recourse may be made to geologic inference. This, of course, begs the question of why one would be concerned with geologic inference when a discovery had already been established. 4/

The opposing view is best seen in United States v. Larsen, supra. In that decision, the Board expressly denied that the Department had held "geologic inference to be without value as evidence of a discovery." Id. at 262. The Board, per Administrative Judge Ritvo, then went on to say:

> While geologic inference may not be relied upon to establish the existence of a mineral deposit, it may be accepted as evidence of the extent of a deposit. That is, where ore had been found, the opinions of experts, based upon knowledge of the geology of the area, the successful development of similar deposits on adjacent mining claims, deductions from established facts -- in short, all of the factors which the Department has refused to accept singly

4/ It would seem that, under this approach, the only possible relevance of geologic inference would be that it might be used to establish the existence of a valuable mineral deposit on adjacent claims. This, however, runs into the oft repeated principle that each claim must have an exposure of a valuable mineral deposit within its boundaries. See, e.g., United States v. Weber Oil Co., 68 IBLA 37, 43, 89 I.D. 538, 540-41 (1982).

> or in combination as constituting the equivalent of a discovery -- may properly be considered in determining whether ore of the quality found, or of any minable quality, exists in sufficient quantity to justify a prudent man in the expenditure of his means with a reasonable anticipation of developing a valuable mine.

Id. Accord, United States v. Hooker, supra.

The source of this conflict can be discerned from a review of the early Departmental and judicial pronouncements on this question. United States v. Henault Mining Co., 73 I.D. 184 (1966), involved a contest initiated under section 5 of the Surface Resources Act, Act of July 23, 1955, 69 Stat. 369, 30 U.S.C. § 613 (1976). The mineral claimant in that case had alleged that high mineral values in the area were consistently found in the Homestake formation. Though the claimant believed that the formation dipped beneath his property, the Homestake formation had not been exposed thereon. Appellant suggested, however, that a number of tertiary dikes which did outcrop on the claims had originated beneath the Homestake formation and thus it could be geologically inferred that the Homestake formation underlay the claims.

In its decision rejecting this contention, the Department expressly noted that there was no contention "that the Tertiary dikes or intrusions carry valuable mineral deposits." 73 I.D. at 193. Responding to an argument that the claimant had met the threefold test established in Jefferson-Montana Copper Mines Co., 41 L.D. 320 (1912), for establishing a discovery on a lode claim, 5/ the Assistant Solicitor adverted to the language immediately following the test, that, among the many factors relevant to the prudent man

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5/ In Jefferson-Montana Copper Mines Co., supra, the First Assistant Secretary stated:

"[I]t is apparent that the following elements are necessary to constitute a valid discovery upon a lode mining claim:

determination were "[t]he size of the vein, as far as disclosed, the quality and quantity of mineral it carries, * * * the geological conditions, the fact that similar veins in the particular locality have been explored with success, and other like facts." 41 L.D. at 323-24.

> This language clearly refers only to the vein or lode which has been discovered and "disclosed" and sets forth the factors for determining whether that vein or lode contains mineral values worth exploiting. In the case here, the only veins or lodes which have been exposed on the claims are the Tertiary dikes or intrusions which are not claimed to be [a] source of valuable mineralization. The discovery upon which the appellant relies is of the Homestake formation which has not been exposed on the claims. [Emphasis in original.]

73 I.D. at 195. Thus, the Henault case merely reaffirmed the traditional view of the Department that an exposure of the vein or lode allegedly carrying the mineral values is a necessary precondition to the validity of a lode claim, and that geologic inference could not be substituted for such an exposure. See, e.g., East Tintic Consolidated Mining Claim, 40 L.D. 271 (1911), on rehearing, 41 L.D. 255 (1912). The Department's decision was affirmed in Henault Mining Co. v. Tysk, supra.

In United States v. Watkins, supra, the Department examined a slightly different question. The issue, therein, was:

> [W]hether there is a difference between the use of inference to establish the existence of a mineral-bearing vein where the vein

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fn. 5 (continued)

"1. There must be a vein or lode of quartz or other rock in place;

"2. The quartz or other rock in place must carry gold or some other valuable mineral deposit;

"3. The two preceding elements, when taken together, must be such as to warrant a prudent man in the expenditure of his time and money in the effort to develop a valuable mine."
Id. at 323.

> itself has not been found and the use of inference to establish the existence of a valuable mineral deposit within a vein where the vein itself has been found but the mineral deposit which it is supposed to contain has not.

This question was answered in the negative. While this decision and the Ninth Circuit decision in Barton v. Morton, supra, which affirmed it, have occasionally been cited as supporting the proposition that geologic inference cannot be utilized until after a showing that a valuable mineral deposit has been "discovered," an analysis of the case does not support this broad proposition.

We believe that the key distinction to keep in mind is the difference between "a mineral deposit," and "a valuable mineral deposit." As modern adjudications have developed, the latter phrase has come to mean a mineral deposit of sufficient quantity and quality so as to justify a prudent man in expending both labor and money in developing a paying mine. Where the term "mineral deposit" is used, it merely means, in the context of a lode claim, that a mineralized area in a vein or lode has been disclosed. It does not necessarily mean that a valuable mineral deposit has been exposed. It is important, therefore, to clearly focus on the specific language of the decision in Watkins. What it exactly holds is that geologic inference may not be used to establish the existence of a valuable mineral deposit where no mineral deposit has been exposed within the claim.

In Watkins, the claimants' experts had expressly testified that the vein showed no economic mineral values in the shallow depth of its exposure. That values existed at depth was presumed from the fact that claims in nearby

areas showed little values on the surface, but substantial percentages of minerals below. In analyzing the claimants' showings, the Department noted:

> But what is the real significance of the evidence of mineralization that has been found here? It is nowhere suggested that any quantity of material of the quality of the vein matter thus far disclosed would constitute a minable body of ore. The evidence does not, in fact, establish any mineral quality of any consistent extent. Although appellants have found ore samples with indicated values exceeding $70 per ton, the record does not support a finding that they have found a deposit yielding ore of that quality, or of any other quality, the exploitation of which may be contemplated. The evidence of record indicates that the values thus far found are spotty, and appellants do not argue otherwise.
>
> Nor does the evidence relating to the geology of the area establish a basis for concluding that there has been a discovery. While it is true that the fact that similar veins in the particular locality have been explored with success is an element to be considered in evaluating the mining potential of a vein, yet it is only one of a number of elements to be considered, and, in this instance, it seems clear that it is far from a conclusive factor.
>
> * * * * * * *
>
> The most that can be said from [the] evidence, and all that the appellants have asserted, is, as observed by the hearing examiner, that the values of the minerals which have been found are sufficient to induce further exploration. Thus, when appellants assert that "a prudent man would be justified in expending further time and effort with a reasonable prospect to develop a paying mine," it is clear that they mean that a prudent man would be justified in expending further time and effort in exploring for minerals with a reasonable prospect of finding a mineral deposit which could be expected to lead to the development of a paying mine. [Emphasis in original.]

United States v. Watkins, supra.

In discussing this decision, and the rationale thereof, this Board has had occasion to note that in the Watkins case as well as United States v. Coston, A-30835 (Feb. 23, 1968):

> [T]he mining claimants failed to establish a basis for even an estimate of the quantity of ore of any particular quality that

> might be found on the claims, and, in the absence of such a foundation, it was found that the attempt to infer the existence of a valuable mineral deposit from the sampling of exposed areas of mineralization was unacceptable evidence of the discovery of such a deposit. [Emphasis supplied.]

United States v. Larsen, supra at 262 n.12. Correctly understood, Watkins stands for the proposition that the mere exposure of isolated mineralization in a vein structure, which mineralization is not, itself, the mineral deposit on which the claim's validity is predicated, affords an inadequate factual basis for the utilization of geologic inference. 6/ Thus, as a practical matter, these cases do not support the view that geologic inference may not be used absent a discovery; rather, they merely reemphasize the fact that geologic inference is but one of many factors that go into the ascertainment of the existence of a valuable mineral deposit.

In a number of subsequent decisions, the Department examined problems relating to showings of isolated mineralization. See, e.g., United States v. Gunsight Mining Co., 5 IBLA 62 (1972), aff'd, Gunsight Mining Co. v. Morton, Civ. No. 72-92 Tux-JAW (D. Ariz. Sept. 12, 1973); United States v. Hines Gilbert Gold Mines Co., supra. Gunsight Mining involved claims located primarily for fluorite. Because, however, the fluorite deposit could not be economically mined alone, validity of the claims depended on the presence of associated metallic minerals which could be mined with the fluorite. While a few of the 400 samples taken showed high values for various minerals, hundreds of other samples showed clearly submarginal values. No deposits

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6/ This analysis, perforce, applies to United States v. Reylea, supra, since that decision is, by and large, merely one long quotation from United States v. Watkins, supra.

of such associated minerals were shown to exist. The Board, in rejecting attempts to apply geologic inference in this fact situation, noted:

> While the Department requires no showing of commercial ore sufficient to assure the economic success of a mining venture, there must be a physical disclosure of a mineral deposit of sufficient value to indicate that it would be reasonable to expect that an economic success would result from the development of a mine. Otherwise the venture would constitute rank speculation, a pure gamble.

5 IBLA At 69. To similar effect is the decision in Hines Gilbert. 7/

While these cases might be read as holding that geologic inference could not be used in situations involving isolated high mineralization, they are better understood as holding that geologic inference, standing alone, is insufficient to establish the existence of a valuable mineral deposit where it is necessary to infer continuity of values at depth where such values have not yet been disclosed. In other words, while geologic inference is, in fact, applicable, isolated and erratic high values are simply incapable of giving rise to an inference that better values exist someplace on the claim.

7/ While the substance of the decision is, indeed, in accord with that of Gunsight Mining, the Board decision in Hines Gilbert did state:

"[I]f the claimant has failed to expose sufficient mineralization within the claims to constitute a discovery of a valuable mineral deposit, it is irrelevant that the land may be considered mineral in character on the basis of geologic inferences drawn from the geologic indicia on the claims themselves and on other nearby lands."

1 IBLA at 298. This statement can only be understood in the context in which it was made. Appellant had alleged that the fact that the land was mineral in character established the validity of its claim. The statement quoted above merely indicated that geologic inference could not establish the validity of a claim in the absence of an exposure of a mineral deposit. The reference therein was not intended to imply that geologic inference could not be used, once an exposure existed, to aid in establishing the extent of the deposit.

In essence, and in practice, geologic inference is primarily applicable as a basis upon which to show continuity of values. Thus, where values have been high and relatively consistent, geologic inference can be used to infer sufficient quantity of similar quality mineralization beyond the actual exposed areas, such that a prudent man would be justified in expending labor and means with a reasonable prospect of success in developing a paying mine. See United States v. Harenberg, 9 IBLA 77, 83 (1973). The vast majority of decisions have followed this analysis. See, e.g., United States v. Hooker, supra; United States v. Kinsley Ranch Resort, Inc., 20 IBLA 14 (1975); United States v. Clifton, 14 IBLA 146 (1974).

Admittedly, both United States v. Walls, 30 IBLA 333 (1977), and United States v. Vaux, 24 IBLA 289 (1976), contain headnotes which, after noting that geologic inference alone cannot support a discovery, state that "[t]he claimant must actually expose a valuable mineral deposit physically within the limits of the claim." 30 IBLA at 334; 24 IBLA at 291. Neither case, however, actually supports the proposition that a valuable mineral deposit must be shown before geologic inference can be used.

In Vaux, there were no exposures of any value in the claims. In Walls, which involved three claims, the only mineralized exposure was a remnant lens of ore on the Dreamland mining claim admittedly representing a quantity of ore not in excess of 15.47 tons. The Administrative Law Judge had determined that, based on reliable assays and cost factors, this lens could not be mined at a profit. The geologic inference which appellants therein sought to apply was the likelihood that another enriched zone, structurally unconnected to the exposed lens, might exist within the claim. Id. at 341-43. The Board

properly rejected the attempt to substitute geologic inference for the necessary exposure. Thus, while the statements made in the headnotes of Vaux and Walls might lend themselves to misinterpretation, these cases do not support the view that a discovery must be shown to exist before recourse may be made to geologic inference.

The decision in United States v. Edeline, supra, holding that geologic inference "cannot be used as a substitute for evidence sufficiently showing the existence of an ore body or bodies necessary to warrant a prudent man to develop a valuable mine" stands in stark isolation as the only case in which such a standard was even arguably applied. Thus, that decision noted that "[w]hile appellants contend that an immediate profit can be realized by mining bodies of exposed ore, the exposed deposits are of such limited extent and their removal such a short-term matter that it would not constitute the development of a mine." 39 IBLA at 241, 247-48. It is precisely on this point we believe the Edeline majority erred by refusing to even consider what might be geologically inferred. Unlike the situation in United States v. Walls, supra, appellants in Edeline were seeking to show continuity of high values in a specific vein based on high values, though of limited extent, on exposed portions of that vein. Quite apart from the question of whether geologic factors would support an inference of continuing high values, the refusal to even consider what might be geologically inferred was in error. To the extent that anything in United States v. Edeline, supra, is inconsistent with our above analysis, it is hereby expressly overruled.

Returning to the instant case, it is obvious in light of our above discussion that, to the extent exposures and samples exist which show high

values of relative consistency, geologic inference is properly used to determine the reasonable likelihood of the persistence of similar mineralization beyond the areas actually sampled or exposed. With this in mind, we will proceed to evaluate the evidence of record.

We will discuss the three mineralized areas (A, B, and C) separately. The testimony was unanimous that an ore body was disclosed in Area A. What was disputed, however, was whether there was a sufficient deposit of the quality of ore exposed to warrant further expenditures in the reasonable prospect of developing a paying mine. This difference of opinion was largely occasioned by differing views by the experts as to whether there was an extension of the deposit delineated in claim Nos. 1 and 2, onto claim Nos. 3, 13, and 14, that is, in a southeasterly direction. We feel that geologic inference could clearly be used to show the extent of the deposit disclosed on claim Nos. 1 and 2. The question, however, is what such inference properly establishes.

Contestees analyzed the deposit in Area A in four segments: Parts I, II, III, and IV. Parts I and II comprised most of the area drilled by Mieritz, with a slight extension to the east. Part III abutted Part II on the southeast and trended in a southeast direction crossing from claim No. 2 to claim No. 3. Part IV abutted Part III basically on its south line and continued to the northern part of claim Nos. 13 and 14. It is contestees' contention that the surface sampling performed by Oxy, when correlated with the various drill holes in Parts I and II and the topography of the area, established that the deposit extended onto Parts III and IV. In order to

establish whether such an inference can be supported, it will be necessary to examine what, precisely, the drill holes showed.

As mentioned above, virtually all of the drill holes in Area A were drilled by Mieritz. While he did not testify, the report which he prepared was submitted at the hearing as Exhibit 2. In this report, Mieritz stated that his drilling program "developed 324,000 tons of 0.77% oxide copper ore, but did not delimit the ore body completely, extensions being possible in three directions; namely, northward, northeasterly and mainly southeasterly -- toward a second known area of mineralization" (Exh. 2 at 4-5 (emphasis in original)).

Insofar as potential ore was concerned Mieritz suggested that "[t]he strong mineralized area southeast of the present ore body is a good target and must be drilled in a grid pattern similar to that used on the present ore body" (Exh. 2 at 6). He also suggested that the "North deposit" (Area B) might, if properly explored, add a substantial ore reserve.

Since the OXY surface sampling program did not occur until 1975, Mieritz' failure to consider that data cannot be used to discount its utility. On the other hand, while Mieritz clearly recognized the potential of a southeast extension, he also clearly expected that it would be tested by drilling, as he had tested the ore body in Parts I and II.

The only report which utilized the OXY surface samples as a basis for computing reserves was that prepared by Fletcher. See Exhibit A. Using reserve terminology of probable and possible, Fletcher estimated total "probable" reserves of 3,180,000 tons at .60 percent copper on Areas A and B,

together with 1,030,000 tons at .30 percent copper on Area C as a "possible" reserve. 8/

The various Government witnesses did not use the surface samples. This omission was justified on two discrete grounds. First, Gould testified that only proven reserves could be used to establish the quantity and quality of a mineral deposit for purposes of establishing a discovery. See Tr. 75, 96, 107-08. While both Mitcham and O'Brien may also have been of the belief that only proven reserves were relevant to the question of discovery, the major thrust of their testimony was that the drill holes had established the limits of the ore body in Area A and that surface sampling produced results too anomalous to permit geologic projections. See Tr. 175, 206-07, 217, 285, 308-11. Thus, we are presented with both a question of law, i.e., can other than "proven" reserves be utilized to show necessary quantity and quality, and a question of fact, i.e., what inferences are properly drawn from the evidence.

Insofar as the question of law is concerned, the answer is relatively clear. In United States v. Hooker, supra, this Board examined the type of reserves necessary to support a discovery of uranium. Id. at 35. The definitions set forth were those used by the Atomic Energy Commission, and thus specifically applicable only to uranium. They are, however, virtually verbatim replications of the definitions jointly used by the Geological Survey

8/ Fletcher's report and testimony were couched in terms of proven, probable, and possible reserves. The Government witnesses generally testified in accordance with the resource classification system delineated in Geological Survey bulletin 1450-A, i.e., measured, indicated, and inferred. While "measured" is comparable to "proven," there is no precise compatibility between "probable" and "indicated" or "possible" and "inferred." As the Bulletin notes, depending upon the amount of sampling both "probable" and "possible" might be classified as "indicated."

and the Bureau of Mines for general use in classifying reserves. The relevant Survey definitions are as follows:

> Measured. -- Reserves or resources for which tonnage is computed from dimensions revealed in outcrops, trenches, workings, and drill holes and for which the grade is computed from the results of detailed sampling. The sites for inspection, sampling, and measurement are spaced so closely and the geologic character is so well defined that size, shape, and mineral content are well established. The computed tonnage and grade are judged to be accurate within limits which are stated, and no such limit is judged to be different from the computed tonnage or grade by more than 20 percent.
>
> Indicated. -- Reserves or resources for which tonnage and grade are computed partly from specific measurements, samples, or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade established throughout.
>
> Demonstrated. -- A collective term for the sum of measured and indicated reserves or resources.
>
> Inferred. -- Reserves or resources for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements. The estimates are based on an assumed continuity or repetition, of which there is geologic evidence; this evidence may include comparison with deposits of similar type. Bodies that are completely concealed may be included if there is specific geologic evidence of their presence. Estimates of inferred reserves or resources should include a statement of specific limits within which the inferred material may lie.

Principles of the Mineral Resources Classification System, Geological Survey Bulletin 1450-A at A3-A4.

In United States v. Hooker, supra, the Board directly held that "indicated" reserves could be used to establish quantity and quality. Id. at 35-36; accord, United States v. Larsen, supra at 262-63. The Board noted, however, that the question of whether "inferred" reserves could be utilized had

yet to be determined. But see United States v. Wells, 11 IBLA 253, 258 (1973).

As noted above, demonstrated reserves (i.e., measured and indicated) can clearly be used to show the quantity necessary to establish a discovery. We do not, however, believe that any such broad ruling can be made insofar as inferred reserves are concerned. To the extent that such an estimate is based on assumed continuity or repetition for which there is geologic evidence, we feel such a reserve base can properly be considered. Where, however, a body is completely concealed, so that its actual existence must be predicated on geologic inference, use of geologic inference would, in effect, substitute for the exposure of the mineral. Such an exposure, however, is a necessary precondition to a discovery. Therefore, an "inferred" reserve whose existence is dependent solely on geologic inference cannot serve as a predicate for finding quantity and quality sufficient to support a discovery.

There was, indeed, a conflict in the testimony whether the mineralized showings in Parts III and IV of Area A constituted either an indicated or inferred reserve. See Tr. 112, 205-06. Mitcham testified that, inasmuch as the drilling in Parts I and II completely delineated the ore body, it would be impossible to infer an extension, though it might be possible to infer another deposit (Tr. 204). O'Brien also questioned whether you could call the mineralized area in Parts III and IV an extension of the ore body delineated in Parts I and II (Tr. 312).

Contestees' witnesses, on the other hand, argued that the projected tonnage in Parts III and IV were properly inferred from the chip samples taken across the face of a 40-foot ore zone (Tr. 418-23). Indeed, Clary

indicated that taking "chip samples in an ore body is an accepted method of determining the grade of it for calculating measured reserves" (Tr. 466). 9/

[3] It is obvious that the key question involved in this appeal is the reliability of the OXY surface samples as a method upon which to premise reserve calculations. In cross-examining Gould, contestees' attorney briefly summarized contestees' theory:

> Q [By Allen] I don't want to belabor or whip a dead horse here or anything, Mr. Gould. But my point is, if you do surface sampling on the grid of the drill area -- okay?
>
> A Yes.
>
> Q And you compare that surface sampling with the drilling results -- okay?
>
> A Yes.
>
> Q They are compatible -- the surface sample on the drilled area and the drill results.
>
> A Yes.
>
> Q And then you do surface sampling in the remaining areas of the known mineralized zone, and those surface samples compared to the surface samples and drill results are compatible, can you not soundly geologically make projections as to what lies between those areas in projecting your ore body just as you do between drill holes?
>
> A No.
>
> Q And it is something that in your opinion is not used in the industry to determine what amount of ore and grade of ore is present?
>
> A I wouldn't use it. You see, copper goes into solution and it can [move] a great distance. You can have a surface sample, an anomaly, that is very high which will have nothing under it.
>
> Q But isn't that the same truth as various parts of a drill hole, that you will have very high parts and maybe barren parts as you --

9/ It is evident, however, that while this form of sampling might show the grade of the deposit, quantity must be dependent upon other factors, including reasonable geologic inference.

A Yes, that's true.

Q And do not the surface samples taken in a sound geological method go through the strata and indicate the strata just as a drill hole does?

A I wouldn't rely on it.

(Tr. 70-71).

The Government, on the other hand, contends that not only would such surface sampling yield inherently unreliable results, but that comparisons of the surface samples with the drilling results in Areas A and B showed that there was no identifiable correlation. Thus, Mitcham testified that the chip samples showed good values in Area A even where drilling had failed to disclose similar values at depth (Tr. 175). Similarly, Mitcham argued that the Mieritz drilling showed little value at depth for the north body, while the surface samples indicated a greater grade of copper than was found in Area A (Tr. 174).

Appellants have strongly attacked this argument. In their statement of reasons, they refer to Mitcham's testimony, note that Mitcham based his conclusions on Exhibit 6, and contend that Exhibit 6 erroneously placed the surface samples as extending beyond certain drill holes when they were, in fact, within these holes. Appellants suggest that this error can be seen by comparing the Mieritz map (Subexh. 5 to Exh. 4) 10/ with Fletcher's map (Exh. G). Our independent review of the various exhibits, however, leads us

10/ Contestees indicated that the Mieritz map was Subexhibit 3 of Exhibit 4. Subexhibit 3, however, consists of the assay sample returns for the drill holes and the chip samples. The Mieritz map is actually Subexhibit 5.

to the opposite conclusion, that contestees' Exhibit G misplaced the drill holes.

One of the problems in a cross comparison is the varying scale of the relevant maps. Thus, Exhibit 6, and Subexhibit 5 are on a scale of 1 inch to 100 feet. The Oxy map (Exh. C and Subexh. 6 of Exh. 4) and the Fletcher map (Exh. G) are both one-half inch to 100 feet. It is impossible, therefore, to visually correlate all of the maps. When actually measured, however, a clear conclusion results.

A key question is whether drill hole H-61, which showed minimal values throughout its 60-foot depth, is located north or south of chip samples 53 and 108. Chip samples 53 and 108 showed copper values of .62 and .76 percent copper, respectively. Government Exhibit 6 placed both of these chip samples northeasterly of drill hole H-61, outside the defined ore body which had been delineated by drilling. Contestees' Exhibit G showed these two surface samples considerably south of drill hole H-61. In fact, chip sample 108 is shown as being south of drill hole H-60, which showed .78 percent copper at a depth of 30 feet. Thus, the contestees' map would tend to corroborate their theory that the drilling and surface sampling yielded consistent values, whereas the Government map supports the view that the surface sampling gave results unsupported by actual drilling. The question, then, is which map is correct.

When measured, the maps show that they actually agree on the placement of the OXY chip samples. Thus, Government Exhibit 6 shows chip sample 52 at approximately 1,050 feet from the south endline of claim 2, chip sample 53 immediately adjacent to chip sample 52 on the north side, and chip sample 108

almost directly south of the junction of samples 52 and 53. Contestees' Exhibit G shows virtually the identical position for these samples. A great difference exists, however, in the placement of drill hole H-61. The Government's map places this hole at approximately 1,025 feet north of the claim's south endline and 50 feet east of its west sideline. Contestees' map, however, places the hole at approximately 1,150 feet north of the endline and 150 feet east of the sideline. The correct placement of this drill hole is controlled by the Mieritz map (Subexh. 5 of Exh. 4).

The Mieritz map places H-61 approximately 980 feet north of the endline and 50 feet east of the sideline. Not only does the Mieritz map support the Government's exhibit, it lends greater weight to its conclusions, since it actually places the drill hole further south of the surface samples than the Government has indicated. Thus, chip samples 53 and 108, which showed good values, are beyond the limits of the ore body as defined by the Mieritz drilling. We have come to the conclusion, therefore, that the chip samples taken in the instant case do not give results sufficiently reliable so as to permit estimates of values at depth on the sole basis of favorable surface showings.

Our conclusion is fortified by comparison of the holes drilled on the north body with the surface samples also taken there. Mieritz drilled five holes in the outcrop. While one showed a value of .41 percent copper at a depth of 10 feet (A 4), none showed any other values throughout their depth. In contradistinction, the surface samples taken from claim No. 7 showed widely varying values. One, in fact, assayed at 2.32 percent copper. While the Mieritz drilling in the north body was admittedly not as structured as

the drilling program in the south body, a number of surface samples show values for which there is absolutely no reason to presume continuance at depth. In short, while the surface sampling results might encourage a prospector to continue his search for a valuable deposit, such sampling, in this case, cannot provide sufficient information which would warrant a prudent man to expend time and money in the reasonable expectation of developing a paying mine. See Barton v. Morton, supra.

This, however, does not necessarily end our analysis since, insofar as Area A is concerned, a mineral deposit has clearly been disclosed and geologic inference, quite independent of the efficacy of the surface sampling, can properly be used to show continuity of values in extensions beyond the disclosed ore body. Mieritz had suggested that extensions were possible, particularly southeasterly. The Government, contrariwise, has suggested that the drilling totally defined the ore body in Area A.

A review of the drilling data does show that the mineralized zone on Area A was virtually bracketed by holes which showed merely waste values. Insofar as a possible southeasterly extension is concerned drill holes H-36 and H-37 averaged values of .05 percent copper over 50 feet and .18 percent copper over 30 feet, respectively. Other drill holes skirting the southeastern perimeter such as H-16, 17A, and 22 show equally minimal values. Considering the topography of the area, in which the drill holes showing value are higher in elevation that those in the southeast which show waste, we see little factual basis for geologically projecting the defined body in Area A beyond the areas delimited by the drill holes. See United States v. Larsen, supra.

Inasmuch as it was conceded by all parties that the 400,000 tons of copper shown to exist on claim Nos. 1 and 2 were insufficient to justify the capital expenditures necessary to successfully mine the deposit, 11/ it is clear that appellants have failed to show by a preponderance of the evidence the existence of a discovery in Area A (embracing claim Nos. 1, 2, 3, 13, and 14). A similar finding necessarily follows for Area B (claim Nos. 5, 7, 8, and 9) since the scattered drilling which was done there gave absolutely no indication that values continue at depths. No other information was tendered which could serve as a factual basis for geologically inferring values sufficient to justify development. With reference to Area C, there was virtually no showing, whatsoever, that mineralization in a vein structure even existed. Thus, we find that Judge Clarke correctly found that these claims are null and void.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decision appealed from is affirmed as modified for the reasons stated herein.

James L. Burski
Administrative Judge

We concur:

Gail M. Frazier
Administrative Judge

Douglas E. Henriques
Administrative Judge

11/ Such was the testimony not only of the Government witnesses but of Fletcher as well. See Tr. 418.